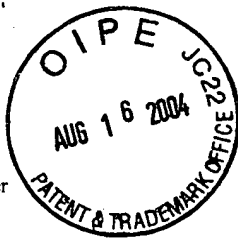


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Patent

Case No.: 55250US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: BENSON, GERALD M.

Application No.: 09/515978

Group Art Unit: 1772

Filed: February 25, 2000

Examiner: Alicia Chevalier

Title: A COMPOUND MOLD AND STURCTURED SURFACE
ARTICLES CONTAINING GEOMETRIC STRUCTURES WITH
COMPOUND FACES AND METHOD OF MAKING SAME

BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
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August 12, 2004
Date

Michele Murphy
Signed by: Michele Murphy

Dear Sir:

This is an appeal from the Office Action mailed on April 23, 2004. This Brief is being filed in triplicate. The fee required under 37 CFR § 1.17(c) for the appeal should be charged to Deposit Account No. 13-3723.

REAL PARTY IN INTEREST

The real party in interest is 3M Company (formerly known as Minnesota Mining and Manufacturing Company) of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any related appeals or interferences.

STATUS OF CLAIMS

Claims 16-23 and 40 are the subject of this appeal. Claims 1-8, 15 and 38-39 have been cancelled. Claims 9-14 and 24-37 have been withdrawn.

STATUS OF AMENDMENTS

A document entitled Amendment And Response Under 37 CFR 1.116 was filed after the final rejection. This document was entered pursuant to the communication mailed July 2, 2004. In fact, the Amendment did not amend any claims.

SUMMARY OF THE INVENTION

The invention that is the subject of the present appeal relates to a compound substrate made up of both a machined substrate or portion and a replicated substrate or portion. The compound substrate of claims 16-19 comprises at least one cube corner element that has at least one face disposed on the replicated substrate and at least one face disposed on the machined substrate. The compound substrate of claims 20-23 comprises a machined substrate disposed in the form of discrete pieces on the replicated substrate. Additionally, each of the machined and replicated substrates has an exposed surface that defined a face of a cube corner element. The embodiment of claim 23 is a cube corner article made by replicating the substrate of claim 20. The compound substrate of claim 40 has both a machined and a replicated portion that together form a face on the structured surface. That is, a portion of the face is made up of the machined portion and a portion of the face is made up of the replicated portion. Each of these portions is on a separate side of a transition line.

The present invention provides articles that heretofore could not employ directly machined substrates. These articles, also referred to as PG cube corner elements, represent one class of the articles attainable with the present invention. Support for these statements may be found in the specification at page 4, line 12 – page 6, line 20 and at page 3, line 23 – page 4, line 5.

ISSUES ON APPEAL

1. Do the phrases “machined substrate” and “machined portion” constitute a method limitation?
2. Do either U.S. Patent 5,614,286 (hereinafter Bacon) or U.S. Patent 5,657,162 (hereinafter Nilsen) provide a product that is substantially identical to the claimed substrates?
3. Do either Bacon or Nilsen anticipate the claims?

GROUPING OF CLAIMS

For purposes of this appeal:

The following groups of appealed claims stand or fall together.

- 1: Claims 16-19 stand or fall together.
- 2: Claims 20-23 stand or fall together.
- 3: Claim 40 stands or falls together.

No admission, however, is being made with respect to the novelty of the subject matter of the dependent claims with respect to the subject matter of the independent claims.

ARGUMENTS OF APPELLANTS**1. ARE “MACHINED SUBSTRATE” AND “MACHINED PORTION” METHOD LIMITATIONS?**

The Examiner has rejected claim 40 over Bacon and claims 16-23 over Nilsen. Both of these rejections are based on the position that the two references anticipate the subject matter of the claims. The Examiner argues that the terminology “machined substrate” and “machined portion” constitute method limitations that are not germane to patentability unless Applicants present evidence from which she could reasonably conclude that the claimed products could differ from those of the cited art.

Applicants submit that the terminology in question is not a method limitation but rather is used as an adjective that is a structural limitation. They further submit that the specification

describes this terminology in a manner that one skilled in the art would understand that it is a structural limitation. Finally, Applicants submit that, as discussed in more detail below, machined defines the physical characteristics of the substrate or portion that it modifies.

“Machined” is used to describe a surface that results when material has been physically removed from a blank to form the desired substrate or surface. This removal is accomplished by, for example, cutting away portions of the blank as is described at page 9, lines 1-12. Removal of material from the blank can be accomplished by, for example, milling, fly cutting, ruling, and grinding. Each of these techniques, described in more detail in the specification at page 9, line 26 – page 10, line 5, uses a different motion to remove material. As a result, each imparts different surface features to the final surface or portion. The common aspect with each of the removal techniques is that they all provide a characteristic surface structure as a result of removing a portion of the blank. However, because each of the removal techniques are different, each imparts different structural features to the substrate or portion. For example, the shape, configuration, length, depth, etc. of the features imparted to the surface varies according to the type of technique. This makes it impossible to generically define the surfaces in purely structural terms. The term “machined”, however, captures the essence of the various structural features of the surface or portion in a single word. It is, therefore, a structural description of the surface.

Applicants note that even the MPEP (see MPEP 2114 at page 2100-59) acknowledges that the structure implied by a seeming process term should be considered in assessing patentability where the product can only be defined by the process steps by which it is made or where the process steps would be expected to impart distinctive structural characteristics to the final product as is the case here. Examples of such terms include “interbonded by interfusion”, “welded”, “intermixed”, “ground in place”, “press fitted”, “etched”, “frozen”, and “chemically engraved”.

In view of this discussion, Applicants submit that the phrases “machined substrate” and “machined portion” are structural limitations and are germane to the issue of patentability.

Applicants also note that a machined substrate and a replicated substrate are structurally different from one another. As discussed above, a machined substrate has surface features that result when the material is removed from the blank. Additionally, the surface of a machined substrate has a crystal structure that is the same as the balance of the substrate. This may be seen by examination of a cross section of the machined substrate.

A replicated substrate, on the other hand, is a reproduction of a pre-existing surface. However, it is not a positive reproduction of the pre-existing surface. Rather, it is a negative reproduction of that pre-existing surface. Moreover, the replicated surface has a different crystal structure than that of the balance of substrate. This is caused by the replication process and may be seen by examination of a cross section of a replicated substrate.

For these additional reasons it is clear that the compound substrates of claims 16-22 and 40 and the cube corner element of claim 23 are different from the replicated surfaces of either Nilsen or Bacon.

2. DO EITHER BACON OR NILSEN PROVIDE A SUBSTANTIALLY IDENTICAL PRODUCT TO THAT OF THE CLAIMED SUBSTRATES?

Neither Bacon nor Nilsen provide a product that is substantially identical to the claimed compound substrates. In fact, all that they disclose are replicated surfaces.

Bacon is directed to a conformable cube corner retroreflective sheet. The sheet of Bacon is a microreplicated sheet. That is, Bacon has no machined surfaces. See for example column 3, line 65 through column 4, line 33. See also column 13, line 13 through column 14, line 42. It is also noted that Bacon specifically says that its structure is a replicated structure. See for example column 6, line 64 through column 7, line 15.

It is clear that nothing in Bacon discloses a machined substrate. In fact, Bacon is entirely silent about a machined surface. As a result, Bacon does not provide a substantially identical product to that of the claimed invention.

Nilsen also fails to disclose a machined substrate. It too is silent about a machined substrate or portion. Like Bacon, Nilsen only discloses replication and replicated surface structures. See column 2, lines 35 through 45. See also column 3, lines 7 through 19. As a result, Nilsen does not provide a substantially identical product to that of the claimed invention.

3. DO EITHER BACON OR NILSEN ANTICIPATE ANY OF THE CLAIMS?

As noted above, the Examiner has rejected claim 40 as anticipated under 35 USC 102 by Bacon and claims 16-23 as anticipated under 35 USC 102 by Nilsen.

With regard to claim 40, Applicants point out that Bacon fails to disclose a required element of the claim, that is the machined portions of the substantially planar surface of at least one compound face. As a result, Bacon cannot anticipate claim 40 as a matter of law.

With regard to claims 16-19 Nilsen fails to disclose a required element of the claims, that is the machined substrate. As a result, Nilsen cannot anticipate claims 16-19 as a matter of law.

With regard to claims 20-22, again Nilsen fails to disclose required elements of the claims, that is the discrete portions of the machined substrate disposed on the structured surface **and** that each of the replicated and machined substrates have an exposed surface that defines a face of a cube corner element. As a result, Nilsen cannot anticipate claims 20-22 as a matter of law.

With regard to claim 23, Nilsen fails to disclose a cube corner element made by replication of the compound substrate of claim 20. As a result, Nilsen cannot anticipate claim 23 as a matter of law.

It also appears that the Examiner has maintained the following rejections:

1. Claim 40 as anticipated by Bacon for reasons of record in paper No. 9, mailed January 2, 2003, page 2, paragraph No. 6.
2. Claims 16-23 and 40 as anticipated by Nilsen for reasons of record in paper No. 6, mailed May 9, 2002, page 4, paragraph No. 8 and paper No. 9, page 2, paragraph No. 6.

The Examiner's reasoning with respect to the first of these rejections appears to be:

Bacon discloses a conformable cube corner reflective sheeting comprising a plurality of discrete cube corner segments (substrate and discontinuous substrate with faces) that are conformably bonded together (col. 6, lines 46-57 and figure 1). The height of the cube corner geometry on the segments is between about 125 to 375 microns (col. 7, lines 1-5). From the figures the retroreflective sheeting can be seen to have a transition line separating the substrates and that the compound face terminates at a nondihedral edge which is not parallel to the nondihedral edge. (See Paper 6, page 4, paragraph 8.)

The Examiner's reasoning with respect to the second of these rejections appears to be:

Nilsen discloses a retroreflective article comprising a solid cube corner prism (substrate with faces) coated with a discontinuous metallic layer

(discontinuous substrate with faces) (col. 2, lines 35-67 and figure 2).

From the figures the retroreflective article can be seen to have a transition line separating the substrates and that the compound face terminates at a nondihedral edge which is not parallel to the nondihedral edge. (See Paper 6, page 4, paragraph 9.)

With respect to claim 40, the Examiner has raised arguments that are either not germane to the claim or appear to be based on a misunderstanding of Bacon. Those arguments that are irrelevant include those based upon a continuous and discontinuous substrate; the height of the segments; and the presence of a nondihedral edge.

The argument that appears to be based on a misunderstanding of Bacon is the presence of a transition line that separates the machined portion from the replicated portion of the substrate. The Examiner argues that Figure 1 of Bacon shows such a transition line.

It is believed that the Examiner is referring to reference numeral 50 in Bacon. This feature of Bacon does not refer to a transition line that separates the constituent faces (i.e., the machined and replicated portions). Rather, reference numeral 50 represents the side walls of discrete replicated cube corner segments of the Bacon reference. Since there are no machined substrates or portions in Bacon, Bacon cannot have a transition line.

With regard to claims 16-23 and 40 the Examiner has also raised arguments that are either not germane to the claims or are based on a misunderstanding of Nilsen. The argument that is not germane to the claims is that the compound face has a non-dihedral edge.

The remaining arguments appear to be based on a misunderstanding of Nilsen. Thus, Nilsen does not disclose faces that comprise both a machined and a replicated substrate or portion. Since Nilsen does not disclose machined faces, it does not disclose a transition line that separates the machined and replicated portions.

The Examiner argues that Figure 2 of Nilsen shows a transition line. It is believed that the Examiner is arguing that the joinder of metallic deposit 30A to the prisms 50 provides the alleged transition line. This joinder does not provide a transition line that separates the machined and replicated features. Thus, it is not a transition line as defined by Applicants.

CONCLUSION

For the foregoing reasons, Appellants respectfully submit that the Examiner has erred in rejecting this application under 35 USC § 102. Please reverse the Examiner on all counts.

Respectfully submitted,

August 12, 2004
Date

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APPENDIX

1-8 (Cancelled).

9. (Withdrawn) A mold comprising a plurality of geometric structures set forth in claim 1.

10. (Withdrawn) The mold of claim 9, wherein the plurality of geometric structures comprise a plurality of cube corner elements.

11. (Withdrawn) The mold of claim 10, wherein at least some of the plurality of cube corner elements are PG cube corner elements.

12. (Withdrawn) The mold of claim 10, wherein the plurality of cube corner elements are part of a structured surface that comprises cavities formed in the replicated substrate and pyramids formed at least in part on the machined substrate.

13. (Withdrawn) The mold of claim 10, wherein at least some of the cube corner elements are arranged in opposing orientations.

14. (Withdrawn) The mold of claim 10, wherein at least some of the cube corner elements are canted and form matched pairs of cube corner elements.

15 (Cancelled).

16. (Previously Presented) A compound substrate comprising a substantially replicated substrate having a structured surface and a discontinuous machined substrate covering only a portion of the structured surface, the compound substrate also comprising at least one geometric structure comprising a cube corner element that has at least one face disposed on the replicated substrate and at least another face disposed on the machined substrate.

17. (Original) The substrate of claim 16 wherein the geometric structure comprises a cube corner element having a cube height of no greater than about 1 mm, the at least one face and the at least another face being disposed on opposite sides of a transition line that is nonparallel to a dihedral edge of the cube corner element.

18. (Original) The substrate of claim 16, wherein the at least one face and the at least another face are disposed on opposite sides of a transition line, wherein substantially all transition lines are parallel to a reference plane.

19. (Original) The substrate of claim 16, wherein the geometric structure comprises a cube corner element having an outline in plan view selected from the group of shapes consisting of a hexagon and a rectangle.

20. (Previously Presented) A compound substrate comprising a substantially replicated substrate and a machined substrate, the replicated substrate having a structured surface and the machined substrate disposed in discrete pieces on the structured surface each of the replicated and machined substrates having an exposed surface that defines a face of a cube corner element on the compound substrate.

21. (Original) The compound substrate of claim 20, wherein the structured surface comprises cavities and the discrete pieces comprise a plurality of pyramids that are adjacent to the cavities.

22. (Original) The compound substrate of claim 21, wherein the pyramids and cavities form cube corner elements that have associated therewith a symmetrical entrance angularity.

23. (Original) A cube corner article made by at least one replication from the substrate of claim 20.

24. (Withdrawn) A method of making a geometric structure in an article, comprising the steps of:

providing a compound substrate having a structured surface formed along an internal interface between two substrates; and

forming grooved side surfaces in an exposed surface of the compound substrate to form a geometric structure, the geometric structure comprising a portion of the internal interface and a portion of the grooved side surfaces.

25. (Withdrawn) The method of claim 24, wherein the geometric structure comprises one of a cube corner element or a PG cube corner element.

26. (Withdrawn) The method of claim 24, wherein the providing step comprises the steps of:

passivating a surface of at least one of the two substrates; and
selectively removing portions of the passivated surface.

27. (Withdrawn) The method of claim 24, wherein the forming step comprises forming an array of cube corner elements, which array includes the geometric structure.

28. (Withdrawn) The method of claim 27, wherein at least some of the cube corner elements are canted and arranged in opposing orientations.

29. (Withdrawn) The method of claim 24, further comprising forming at least one reference mark in at least one of the two substrates.

30. (Withdrawn) The method of claim 24, wherein the grooved side surfaces extend along axes that are parallel to a common plane.

31. (Withdrawn) The method of claim 24, wherein the providing step comprises:
providing a first substrate;
forming a plurality of faces in a first surface of the first substrate; and

forming a second substrate over the plurality of faces as a replica.

32. (Withdrawn) The method of claim 31, wherein the forming a plurality of faces in the first surface comprises forming at least two intersecting sets of parallel v-shaped grooves.

33. (Withdrawn) The method of claim 24, wherein the step of forming grooved side surfaces produces discrete pieces of one of the two substrates on the other substrate, the method further comprising the step of:

removing at least some of the discrete pieces to expose portions of the internal interface.

34. (Withdrawn) The method of claim 24, further comprising the step of:
replicating the geometric structure to form retroreflective sheeting.

35. (Withdrawn) The method of claim 24, wherein the step of forming grooved side surfaces comprises the step of forming a plurality of geometric structures selected from the group consisting of three-sided geometric structures and four-sided geometric structures.

36. (Withdrawn) A method of making a structured surface article comprising a geometric structure having a plurality of faces, the method comprising the steps of:

forming a plurality of faces in a first surface of a machined substrate;

forming a replicated substrate of the machined substrate to form a compound substrate;

forming a plurality of faces in a second surface of the machined substrate opposite the first surface; and

removing selected portions of the machined substrate to form a geometric structure having at least a first face disposed on the machined substrate and at least a second face disposed on the replicated substrate.

37. (Withdrawn) The method of claim 36, wherein the geometric structure is one of a plurality of geometric structures each comprising a cube corner element, at least some of the cube corner elements being arranged in opposing orientations.

38-39 (Cancelled).

40. (Previously Presented) A compound substrate having a structured surface comprising a substantially replicated portion and a machined portion, the compound substrate further comprising at least one compound face thereon wherein the at least one compound face has a substantially planar surface having a first face portion on the machined portion of the compound substrate and a second face portion on the substantially replicated portion of the substrate, the first and second face portions being on opposite sides of a transition line.